II. Remarks

Support for the various amendments made to the claims herein may be found throughout the application as filed. No new claims are introduced herein. No claims are cancelled herein. Claims 4, 8, 9, and 14-20 remain pending herein, all of which claims are amended herein. No new matter has been added as a result of the claim amendments. Applicants respectfully request further examination and allowance of the claims as amended herein in view of the analysis set forth below.

III. Rejections of Claims

In the Final Office Action from the Examiner mailed February 21, 2007, the Examiner rejected claims on the following basis:

(1) Claims 4 and 15-20 were rejected under the second paragraph of 35 U.S.C. Section 112 as being indefinite;

(2) Claims 4, 8, 9, and 14-20 were rejected as being unpatentable over U.S. Patent No. 6,653,620 to Blasing;

(3) Claims 19 and 20 were rejected as being unpatentable over U.S. Patent No. 6,653,620 to Blasing in view of U.S. Patent No. 6,483,104 to Benz;

The foregoing rejections are responded to below. Before responding to the rejections, however, a summary of the claimed subject as amended herein is presented, followed by a detailed review the Blasing and Benz references cited by the Examiner in formulating rejections (2) and (3) above.

IV. Summary of the Claimed Subject Matter

Various embodiments of the present invention relate to an optical encoder system having a code disk and an associated light source and detectors configured to transmit light through the disk and receive same on a side opposite the light source. The system is configured to compensate for changes in transparency of the disk occurring as a result of contaminants collecting on the disk surface by causing the light source to increase in brightness and by causing the disk to be wiped clean when the degree of transparency falls below a predetermined threshold.

Independent claim 4 as amended herein is illustrative, as it contains most of the limitations set forth in the other still-pending claims. As amended herein, claim 4 recites the following subject matter and elements:

Claim 1:

(a) an optical encoding system, comprising:

(b) a light source configured to emit light;

(c) a code strip, comprising:

(d) a calibration area configured to generate a calibration signal;

(e) the calibration area having a degree of transparency associated therewith that decreases as contaminants collect on the code strip;

(f) an indexing area configured to generate an indexing signal, and

(g) an encoding area for generating an encoding signal;

(h) a photo detector, comprising:

(i) a calibration photodiode configured to convert light transmitted through the calibration area from the light source into an electrical calibration signal;

(j) the calibration signal being used to determine the degree of transparency of the calibration area;

(k) an indexing photodiode configured to convert light transmitted through the indexing area from the light source into an electrical indexing signal; and

(l) an encoding photodiode configured to convert light transmitted through the encoding area from the light source into an electrical encoding signal;

(m) a calibration circuit operably coupled to the photo detector and the light source, the circuit being configured to compare the degree of transparency to a threshold value, and in the event the threshold value is greater than or equal to the degree of transparency, the calibration circuit further being configured to increase a current provided to the photo-emitter to increase a brightness of light emitted therefrom.

Note that reference letters are employed hereinabove merely to partition the various elements of the claims for the sake of convenience, as well as to make the discussion following hereinbelow more clear. No limitations resulting merely from partitioning the various elements of the claims as set forth above should be read into or inferred into the claims.

See Fig. 4 of the present application, which is reproduced hereinbelow.

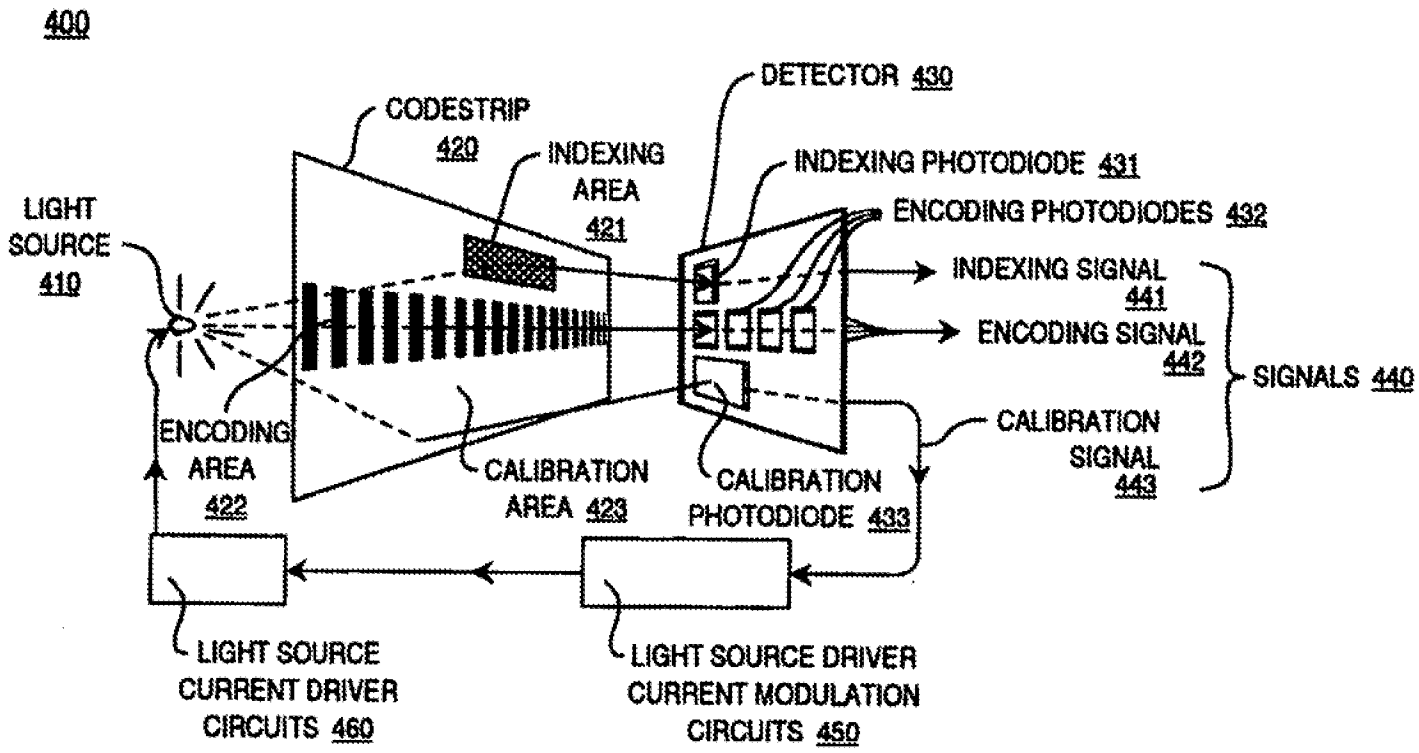


FIGURE 4

Fig. 4 of the present application

V. The Cited References

A. The Blasing Reference

The Blasing reference (U.S. Patent No. 6,653,620) discloses "a method for evaluating a signal generated by a position measuring system having an encoder with a code track. The encoder is interposed between a light source and a light sensor and moves relative to the light source and the sensor such that the code track transmits light from the light source onto the sensor. The light sensor generates the signal as a function of the light received by transducers of the sensor. The method includes determining brightness of a code track signal generated by sensor transducers assigned to a code track of the encoder and determining brightness of a non-code track signal generated by sensor transducers assigned to a non-code track of the encoder. The sensor transducers assigned to the code track of the encoder are then determined as being exposed to the light source as a function of the relative brightness between the code and non-code track signals." See the Abstract of the Blasing reference.

The Examiner cited various portions of the Blasing reference in rejecting the claims. Below are set forth those portions of the Blasing reference cited by the Examiner, as well as other pertinent portions thereof:

Although the previously known process can achieve sufficiently precise results when the conditions which have an influence on signal detection remain constant, such position and angular position measuring devices can provide incorrect measurement results if, for example, environmental influences should change the idealized measurement parameters specified during the design of the position or angular position measuring device. When such an angular position measuring device is used as a motor vehicle steering angle sensor exact angle detection should be ensured under the most diverse influences.

For example, ***such a measuring system can be affected by stray light, or by the encoder disk being covered with condensation, ice, dust, etc., and the signal threshold is often exceeded in the examples mentioned not only when there is an actual direct exposure by the coding of a code track, but also due to stray light exposing the transducer elements assigned to such a code track***. In a corresponding manner, it is also possible for the signal threshold not to be exceeded despite being exposed by the coding of a code track, for example, when there is dust. In these cases the angle value read from a steering angle sensor is faulty. Accordingly, the subsequent evaluations and analyses based on this value are also faulty.

SUMMARY OF THE INVENTION

Therefore, starting from this prior art that has been discussed, the invention is based on the task of further developing a process of the type mentioned above in such a way that it is able to avoid as much as possible the disadvantages described above.

In accordance with the invention this task is solved by evaluating the signal amplitudes of the transducers assigned to a code track and a non-code track. ***The relative difference in brightness is determined between the code track signal (which is relatively brighter when there is an exposure) and a non-track signal (which is relatively darker). A determination is then made on the basis of the difference in brightness about whether or not the transducers assigned to the code track are exposed by the coding of the code track.***

In contrast to the known prior art, ***the process according to the invention involves evaluating the signal amplitude assigned to the one code track not in comparison with a specified fixed absolute signal threshold, but rather by determining the relative difference in brightness between the code track signal (which is relatively brighter when there is an exposure) and a non-track signal (which is relatively darker compared with it). Thus, in principle, the evaluation is independent of a signal threshold that takes into account only the absolute signal amplitude. The evaluation of signal amplitudes is much more sensitive this way, so that the decision threshold can be established at a substantially lower level.***

This method makes it possible to compensate for environmental influences ***by relative evaluation.*** If there should be a reduction, which might also possibly be only local, in the luminosity exposing the sensor array transducers--which would mean that the signal would no longer be recognized using the prior art, for example--there still remains a detectable contrast between a code track or code track section exposing certain of the sensor array transducers and the non-track sections not exposed by these code tracks, so that the desired

evaluation can be carried out without limitations. ***The signals of a code track are then evaluated as a function of the difference in brightness that is found between the code track signal (which is relatively brighter when there is an exposure) and a non-track signal (which is relatively darker) by determining whether or not the transducers assigned to the at least one code track are exposed by the coding.***

The ***difference in brightness between the signals of a code track and a non-code track*** can be determined, for example, by considering the difference in these signal amplitudes, with a specified difference in brightness serving as a signal threshold. However, the relative difference in brightness of the two signal amplitudes can also be determined by dividing one by the other, with a specified ratio then serving as a signal threshold. *[Emphasis added.] Col. 2, line 6 through col. 3, line 17 of U.S. Patent No. 6,653,620 to Blasing.*

In another process step ***the signal amplitude of the reference signal is evaluated and compared, possibly with an absolute value or with previously recorded and stored reference signal amplitudes. Next, at least one of the parameters that is relevant for evaluating the amplitude is adapted on the basis of the result of the evaluation of the reference signal's amplitude. For example, if the amplitude of the reference signal is less than its earlier amplitudes and if this is due, for example, to condensation on the encoder disk or to the deposit of dust on the encoder disk, this can be compensated for by increasing the exposure time or the number of measurement steps necessary for capturing a signal amplitude, which are parameters that are relevant for evaluating the signal amplitudes. It***

is also possible to increase the luminosity of the light source so that after this adaptation the reference signal's amplitude once again has the value that was originally set. *[Emphasis added.] Col. 4, lines 7-24 of U.S. Patent No. 6,653,620 to Blasing.*

In FIG. 1, the reference tracks are marked with the letter "R" and the individual tracks are marked with the numbers "1" through "9". The intermediate track signals can be sampled through the transducers lying between the individual tracks. Each code track has a certain number of transducers of the sensor line assigned to it, e.g., three or five. *[Emphasis added.] Col. 5, lines 4-10 of U.S. Patent No. 6,653,620 to Blasing.*

The reference tracks are used to compensate for movements which occur transverse to the direction of motion of the code tracks when the encoder disk moves. The distance of the code tracks from one another is known after the reference tracks R are detected, which allows certain transducers of the line sensor to be assigned to a certain code track. The transducers of the line sensor, which are located between the transducers assigned to the code tracks, are also evaluated and provide a reference value by making available a non-track signal or an intermediate track signal.

To evaluate the read-out result shown in FIG. 1, ***the relative difference in brightness between the signal amplitude of a code track and that of a neighboring non-code track***--each of which is shown in FIG. 1 by the crosses in the curve, which represent the calculated signal amplitude from the transducers sampling this track--is determined, for example by forming a ratio. It can be seen in FIG. 1 that the relative difference in brightness between the signal amplitudes of

> tracks 1, 2, 4, and 7 relative to the signal amplitudes of the neighboring intermediate track signals is only very small. If ratios are formed of the signal amplitudes of code tracks 1, 2, 4, and 7 to the signal amplitudes of the neighboring intermediate tracks, and if these ratios are compared with a predetermined threshold, they do not exceed it.
>
> Consequently, these tracks are considered unexposed by the coding of the encoder disk, as indicated in FIG. 1 by a "0" above each of these tracks in the "Result" line. The signal brightness determined by the line sensor transducers that are assigned to code tracks 3, 5, 6, 8, and 9 is several times higher than the signal brightness of the neighboring intermediate tracks. Consequently, these tracks are considered exposed which is indicated in FIG. 1 by a "1" above each of them. *[Emphasis added.] Col. 5, lines 16-49 of U.S. Patent No. 6,653,620 to Blasing.*

See also Figs 1, 2 and 3 from the Blasing reference, which are reproduced below:

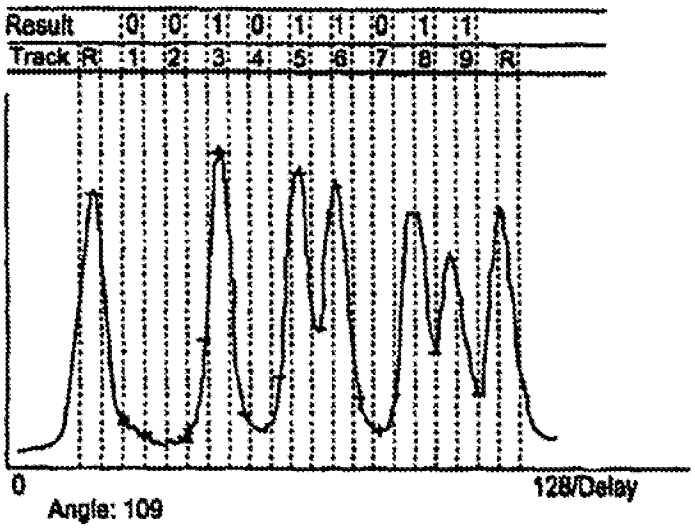


FIG.1

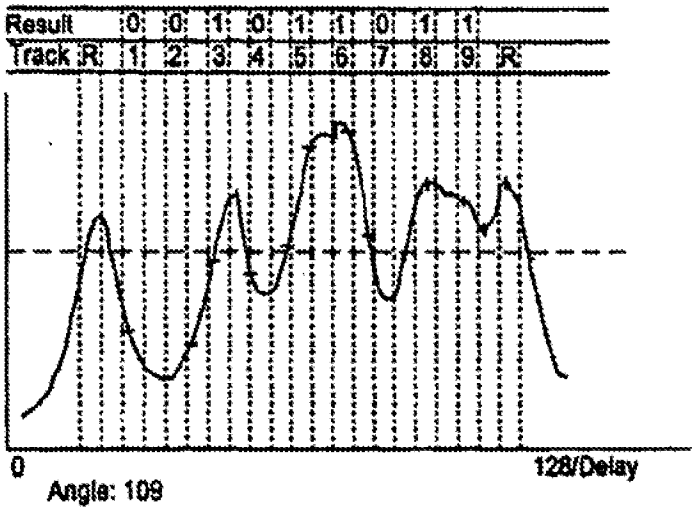


FIG.2

Figs. 1 and 2 of the Blasing Reference

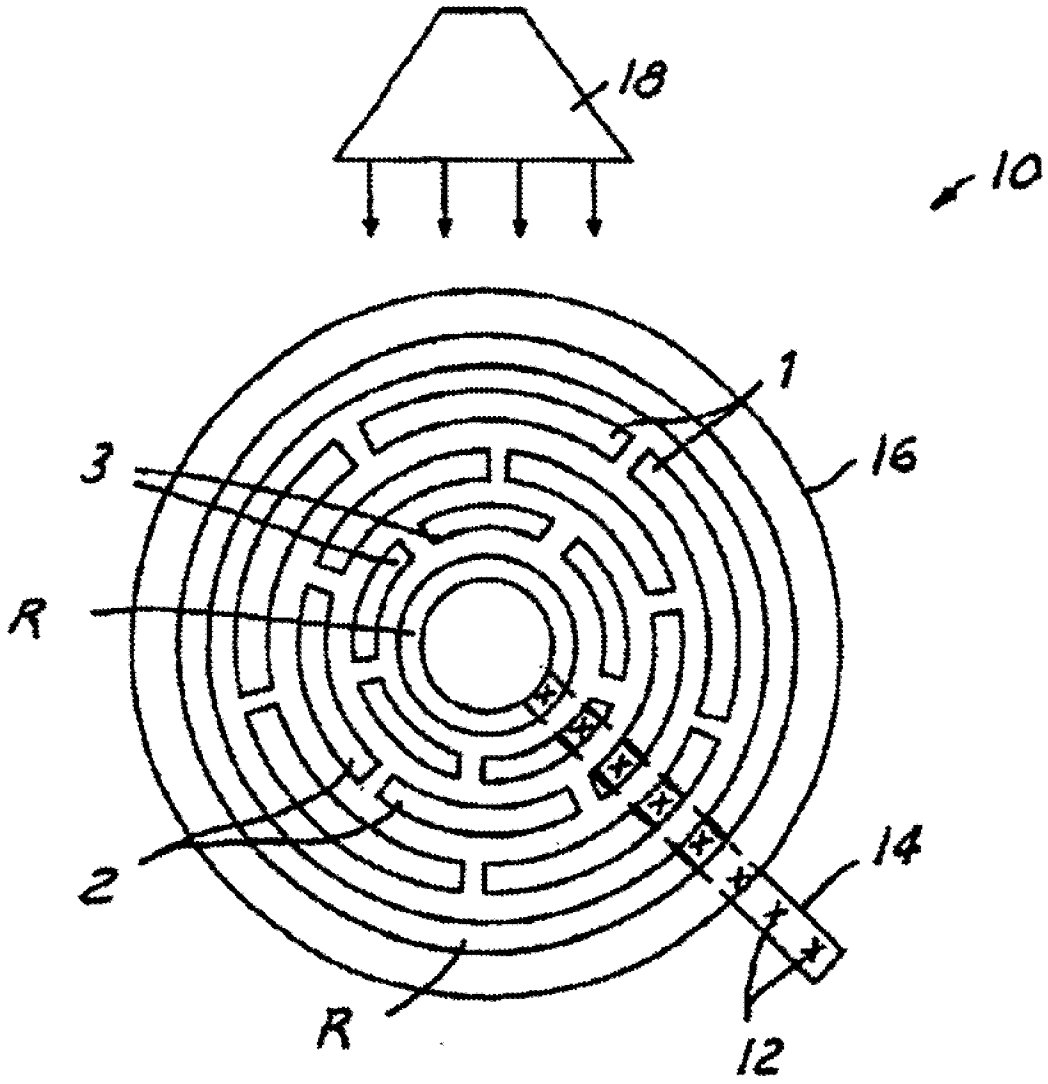


FIG.3

Fig. 3 of the Blasing Reference

Reading the above excerpts and other portions of the Blasing reference reveals that this reference is related only peripherally to the invention described and recited in the present application.

The portion of the Blasing reference cited by the Examiner (col. 4, lines 6-25 thereof) in rejecting the claims is highly misleading and has clearly been taken out of context. More particularly, the cited portion of the Blasing reference describes how the ***reference*** signal can be manipulated to provide ***a suitable reference signal***. As disclosed in detail in the Blasing reference, ***the reference signal is employed to compensate for movements which occur transverse to the direction of motion of the code tracks when the encoder disk moves***, and has nothing to do with compensating for contaminants disposed on the code tracks of an optical encoder disk. See col. 5, lines 16-32. Indeed, the only means of compensating for contaminants disposed on the code tracks of an optical encoder disk disclosed in the Blasing reference is to determine the relative brightnesses of light signals transmitted through ***coded and non-coded portions of an optical encoder disk***, and then determining whether the sensed tracks are "exposed" or "unexposed." Notably, ***nowhere*** in the Blasing reference are reference signals employed in making such a determination or adjusting the brightness of light transmitted through non-reference portions of an optical encoder disk. See Figs. 1-3 and col. 5, lines 27-49 of the Blasing reference.

While the Blasing reference contains copious detail regarding measuring the differences in brightness of coded and non-coded tracks of an optical encoder disk in an optical encoding system, there is no explicit or implicit disclosure, or suggestion or hint at, most of the elements and limitations recited in the claims of the present application.

For example, the Blasing reference does not disclose, hint at or suggest any of the following elements recited in independent claims 4:

(d) a calibration area configured to generate a calibration signal;

(e) the calibration area having a degree of transparency associated therewith that decreases as contaminants collect on the code strip;

(f) an indexing area configured to generate an indexing signal, and

(h) a photo detector, comprising:

(i) a calibration photodiode configured to convert light transmitted through the calibration area from the light source into an electrical calibration signal;

(j) the calibration signal being used to determine the degree of transparency of the calibration area;

(k) an indexing photodiode configured to convert light transmitted through the indexing area from the light source into an electrical indexing signal; or

(m) a calibration circuit operably coupled to the photo detector and the light source, the circuit being configured to compare the degree of transparency to a threshold value, and in the event the threshold value is greater than or equal to the degree of transparency, the calibration circuit further being configured to increase a current provided to the photo-emitter to increase a brightness of light emitted therefrom in a direction of the indexing area and the encoding area.

Instead, the Blasing reference discloses a position measuring system comprising a series of line sensors disposed beneath an encoder disk having a plurality of code tracks. There is simply no disclosure anywhere in the Blasing reference of a calibration area, an indexing area, a photo detector comprising a calibration photodiode, an indexing photodiode, a calibration circuit operably coupled to the photo

detector and the light source and configured to compare a degree of transparency of a calibration area to a threshold value, and in the event the threshold value is greater than or equal to the degree of transparency, the calibration circuit further being configured to increase a current provided to the photo-emitter to increase a brightness of light emitted therefrom in a direction of the indexing area and the encoding area.

Indeed, the Blasing reference teaches away from the present invention, as evidenced by the following teachings set forth therein:

> Previously known position and angular position measuring devices ***evaluate the signal amplitudes of the transducers assigned to each code track by comparing the signal amplitude with a specified signal threshold. If the signal threshold is exceeded, the signal amplitude of the transducers assigned to this code track is evaluated as being exposed by the coding of the code track. If the signal amplitude is smaller than the specified signal threshold, an evaluation is made that the coding of this code track is not causing exposure of the transducers assigned to this code track.***
>
> Assignment of certain transducers to a code track is used in the previously known process ***to compensate for play*** of the encoder disk in its movement relative to the transceiver. For this purpose, the coding has at least one reference track assigned to it. Because the distance from the code tracks to the reference track is the same over the length of the code tracks, it can be determined which code track is exposing which transducer(s) by determining the position of the reference track on the sensor array.

> Although the previously known process can achieve sufficiently precise results when the conditions which have an influence on signal detection remain constant, ***such position and angular position measuring devices can provide incorrect measurement results if, for example, environmental influences should change the idealized measurement parameters specified during the design of the position or angular position measuring device.*** When such an angular position measuring device is used as a motor vehicle steering angle sensor exact angle detection should be ensured under the most diverse influences.
>
> For example, such a measuring system can be affected by stray light, or by the encoder disk being covered with condensation, ice, dust, etc., and the signal threshold is often exceeded in the examples mentioned not only when there is an actual direct exposure by the coding of a code track, but also due to stray light exposing the transducer elements assigned to such a code track. In a corresponding manner, it is also possible for the signal threshold not to be exceeded despite being exposed by the coding of a code track, for example, when there is dust. In these cases the angle value read from a steering angle sensor is faulty. Accordingly, the subsequent evaluations and analyses based on this value are also faulty. *[Emphasis added.] Col. 1, lines 54-67 and col. 2, lines 1-29 of U.S. Patent No. 6,653,620 to Blasing.*

The foregoing excerpts show that the Blasing reference teaches that employing the comparison of a signal amplitude measured in respect of a coded track to a threshold value to determine whether a portion of an optical encoding disk has been exposed or not provides unreliable results, especially when dust, ice or snow are present. Thus,

the Blasing reference teaches directly away from the concept of comparing a single measured voltage or brightness, measured in a calibration area of the wheel, to a predetermined threshold value to compensate for changes in the degree of transparency of the encoding and indexing areas of a encoding wheel. Indeed, ***the Blasing reference states explicitly that any approach based on such a comparison would not work when contaminants are present on the wheel.***

B. The Benz Reference

The Benz reference (U.S. Patent No. 6,653,620) discloses "a position sensor with a high resolution. For this purpose, the invention proposes several measures, such as pulsed operation of the light source and using a digital code for the code element. Advantageous embodiments involve selecting a maximum code and more accurate determination of the approximate position value thus obtained from the resulting digital value. A further improvement in measurement accuracy can be achieved by shifting the code track or several code tracks arranged radially one inside the other." See the Abstract of the Benz reference.

The Examiner cited one portion of the Benz reference in rejecting the claims. Below is set forth that portion of the Benz, as well as other pertinent portions thereof:

The invention consists in principle of greatly shortening the lighting duration of the code element, i.e., of the rotation sensor of the code disk. The code element is lighted only briefly, approximately in the manner of a stroboscope. One disadvantage of the invention could be that the light flux output and thus the charge picked up by the collecting elements is comparatively low. This situation can be remedied where the light source is operated so that the rated output is obtained for the entire period. Thus, in other words, ***a large amount of light is delivered by the light source for short periods of time.*** To be able to determine unambiguously the position of the code element after the charging process on the basis of the reduced light flux, the on-time of the light source is preferably synchronized with the sampling time and the readout timing. Tests have shown that the cyclic on-time corresponding to the features according to claim 3 should amount to less than 5% of the cycle time and, better yet, less than 1% of the cycle time. *[Emphasis added.] Col. 2, lines 10-27 of U.S. Patent No. 6,483,104 to Benz.*

With corresponding analysis algorithms (software), a resolution in the sub-pixel range can be achieved. To increase accuracy, ***the contrast*** between reproduction of light-transmitting code fields versus opaque code fields can also be determined. ***A reduction in differential values (contrast) [must] be detected here due to soiling of code fields due to some dirt on the light-transmitting fields.*** If the contrast sinks below a certain threshold, it may mean that the disk needs to be cleaned or replaced. The transmitting power of the light source be adjusted to restore the desired contrast by increasing the transmitting power or lengthening the transmitting time. *[Emphasis added.] Col. 4, lines 7-19 of U.S. Patent No. 6,483,104 to Benz.*

See also Fig. 2 from the Benz reference, which is reproduced below:

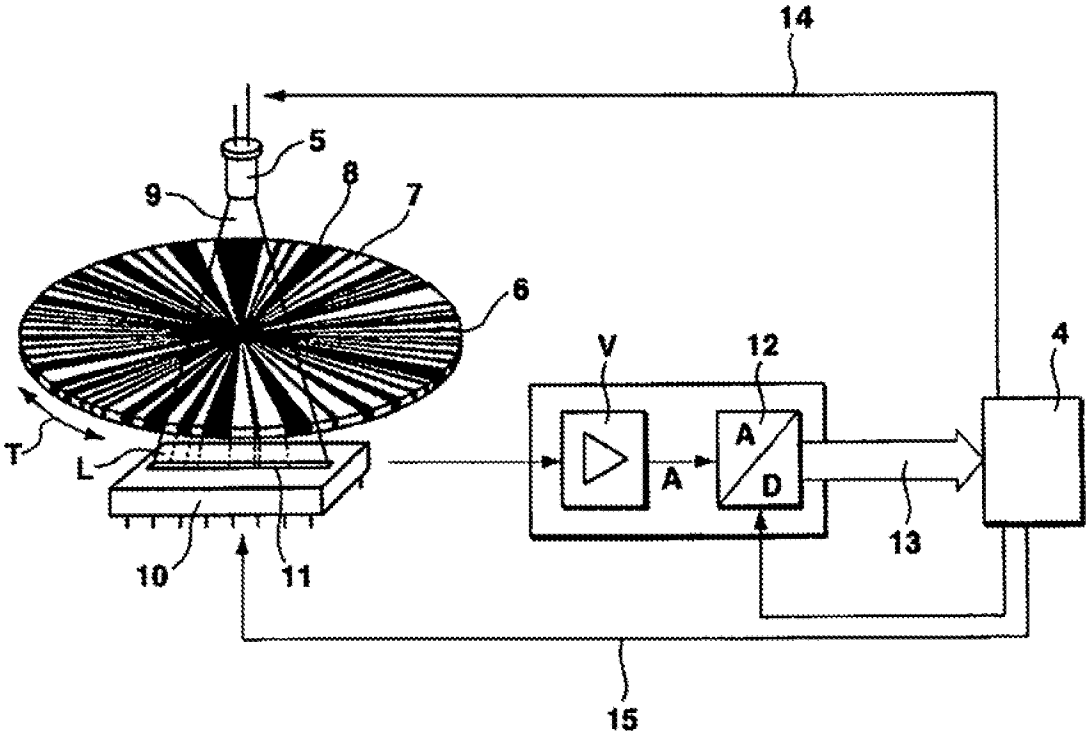


Fig. 2

Fig. 2 of the Benz Reference

Reading the above excerpts and other portions of the Benz reference reveals that this reference is also related only peripherally to the invention described and recited in the present application. Like the Blasing reference, the Benz reference is directed to a position sensor, and not an optical encoding system comprising indexing and encoding sections. Also like the Blasing reference, the Benz reference discloses a system that employs differential comparisons and measurements to effect adjustments in light source power. This conclusion is firmly supported by referring to the language employed by Benz et al. in the portion cited by the Examiner, where ***the contrast*** between reproduction of light-transmitting code fields versus opaque code fields is determined. Benz et al. go to state that contaminants (or "soiling") of code fields is compensated for by detecting differential values corresponding to coded and non-coded portions of an encoding wheel.

While like the Blasing reference the Benz reference contains copious detail regarding measuring the differences in brightness of coded and non-coded tracks of an optical encoder disk in an optical encoding system, there is no explicit or implicit disclosure, or suggestion or hint at, most of the elements and limitations recited in the claims of the present application.

For example, the Benz reference does not disclose, hint at or suggest any of the following elements recited in independent claims 4:

(d) a calibration area configured to generate a calibration signal;

(e) the calibration area having a degree of transparency associated therewith that decreases as contaminants collect on the code strip;

(f) an indexing area configured to generate an indexing signal, and

(h) a photo detector, comprising:

(i) a calibration photodiode configured to convert light transmitted through the calibration area from the light source into an electrical calibration signal;

(j) the calibration signal being used to determine the degree of transparency of the calibration area;

(k) an indexing photodiode configured to convert light transmitted through the indexing area from the light source into an electrical indexing signal; or

(m) a calibration circuit operably coupled to the photo detector and the light source, the circuit being configured to compare the degree of transparency to a threshold value, and in the event the threshold value is greater than or equal to the degree of transparency, the calibration circuit further being configured to increase a current provided to the photo-emitter to increase a brightness of light emitted therefrom in a direction of the indexing area and the encoding area.

Instead, the Benz reference discloses a position measuring system comprising a series of line sensors disposed beneath an encoder disk having a plurality of code tracks. There is no disclosure anywhere in the Benz reference of a calibration area, an indexing area, a photo detector comprising a calibration photodiode, an indexing photodiode, a calibration circuit operably coupled to the photo detector and the light source and configured to compare a degree of transparency of a calibration area to a threshold value, and in the event the threshold value is greater than or equal to the degree of transparency, the calibration circuit further being configured to increase a current provided to the photo-emitter to increase a brightness of light emitted therefrom in a direction of the indexing area and the encoding area.

Indeed, and like the Blasing reference, the Benz reference teaches away from the present invention, as evidenced by its teaching that differential measurements of non-calibration areas be carried out to compensate for soiling of the wheel. Thus, the Blasing reference teaches directly away from the concept of comparing a single measured voltage or brightness, measured in a calibration area of the wheel, to a predetermined threshold value to compensate for changes in the degree of transparency of the encoding and indexing areas of a encoding wheel.

VI. Response to Rejections Made in the Final Office Action

(1) Claims 4 and 15-20 as amended herein overcome the rejections made the second paragraph of Section 112.

Claims 4 and 15-20 are amended herein in such a manner as to overcome all the rejections made of such claims by the Examiner under the second paragraph of Section 112.

(2) Claims 4, 8, 9 and 14-20 as amended herein are not obvious in view of the Blasing reference

Claims 4, 8, 9 and 14-20 as amended herein are not obvious in view of the Blasing reference for the reasons which follow below.

Each of claims 4, 8, 9 and 14-20 as amended herein requires at least the following elements:

(d) a calibration area configured to generate a calibration signal;

(e) the calibration area having a degree of transparency associated therewith that decreases as contaminants collect on the code strip;

(f) an indexing area configured to generate an indexing signal, and

(h) a photo detector, comprising:

(i) a calibration photodiode configured to convert light transmitted through the calibration area from the light source into an electrical calibration signal;

(j) the calibration signal being used to determine the degree of transparency of the calibration area;

(k) an indexing photodiode configured to convert light transmitted through the indexing area from the light source into an electrical indexing signal; or

(m) a calibration circuit operably coupled to the photo detector and the light source, the circuit being configured to compare the degree of transparency to a threshold value, and in the event the threshold value is greater than or equal to the degree of transparency, the calibration circuit further being configured to increase a current provided to the photo-emitter to increase a brightness of light emitted therefrom in a direction of the indexing area and the encoding area.

As shown in detail above, the Blasing reference does not disclose, hint at or suggest ***any of the above elements*** recited in claims 4, 8, 9 and 14-20.

The Applicants have discovered that a certain novel combination of optical, electrical and electronic components combined and configured in a certain order are required to produce the beneficial effects of the present invention. As demonstrated above, most of those components and configurations are neither disclosed nor suggested anywhere

in the Blasing reference, and accordingly cannot be *prima facie* obvious.

Merely asserting that "would be obvious to try" the invention by making reference to the generalized position determination techniques disclosed in the Blasing reference, while essentially creating other claimed elements out of whole cloth without referring to any specific portions of the cited references to establish a motivation for combining elements or functionality disclosed therein, does not establish a *prima facie* case of obviousness. In going from the prior art to the claimed invention, one cannot base obviousness on what a person skilled in the art might try or find obvious to *try*, but rather must consider what the prior art would have lead a person skilled in the art to *do*.

There is no incentive, teaching or suggestion in the Blasing reference to produce the invention now recited in claims 4, 8, 9 and 14-20. The mere fact that the cited Blasing reference could, with the benefit of hindsight, produce something vaguely similar to the present invention does not make the modification obvious, or suggest the desirability of the modification required to arrive at the present invention. Indeed, this conclusion is buttressed by the fact that numerous elements and limitations are missing in the Blasing reference in respect of all of claims 4, 8, 9 and 14-20 as amended herein (and as discussed in detail above).

Moreover, and as discussed in detail above, the Blasing reference teaches directly away from the presently-claimed invention by teaching that comparing a single voltage or measurement to a reference voltage or value would result in an optical encoding system incapable of compensating for contaminants disposed on an encoding wheel.

It is well settled that a motivation to combine elements or limitations disclosed in disparate references *must be found within the references themselves or from pertinent sources of extrinsic information,* and that such a motivation does not arise, as here, by merely identifying a collection of disparate piece parts in a combination of references, and then asserting it would have been obvious to take such disparate elements and limitations and add many others thereto to arrive at the presently claimed invention.

There is no suggestion of what direction any experimentation should follow in the Blasing reference to obtain the invention now recited in claims 4, 8, 9 and 14-20. Accordingly, the result effective variables, for example providing a calibration area on an encoding wheel or disk, transmitting light therethrough, and measuring the light transmitted therethrough and comparing same to a threshold value to arrive at a degree of transparency for the encoding wheel as a whole, and then adjusting the light emitted by a light source in the direction of encoding and indexing portions of the wheel to compensate for the presence of contaminants

disposed on the wheel, are not known to be result effective. Thousands or millions of attempts at variations might be made before arriving at the desired improvement. Thus, to say that it would be obvious to read the Blasing reference and somehow arrive at the invention now recited in claims 4, 8, 9 and 14-20 would clearly not be the test for obviousness.

The foregoing analysis also makes it clear that there is no basis in the art for modifying the teachings of the Blasing reference to arrive at the invention now recited in claims 4, 8, 9 and 14-20. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. While the Blasing reference teaches some of the problems associated with contaminants being present on an encoding wheel, the solutions to such problems proffered by Blasing teach directly away from those of the present invention

When, as here, the prior art itself provides no apparent reason for one of ordinary skill in the art to make a modification or to combine references, an argument clearly does not exist that the claimed subject matter would have been obvious. Thus, an attempt to use the applicants' own disclosure as a blueprint to reconstruct in hindsight the invention now recited in claim as amended herein out of isolated teachings appearing in the prior art is clearly be improper.

The results and advantages produced by the invention set forth in claims 4, 8, 9 and 14-20 as amended herein, and of which the cited Blasing reference are devoid, cannot be ignored simply because the claim limitations might be deemed similar to the otherwise barren prior art.

The foregoing analysis also makes it clear that many limitations appearing in claims 4, 8, 9 and 14-20 as amended herein are not present in the Blasing reference. When evaluating a claim for determining obviousness, *all* limitations of the claim must be evaluated. Under §103, the Examiner cannot in turn dissect claims 4, 8, 9 and 14-20as amended herein, excise the various individual elements recited in the claims, and then declare the remaining portions of the mutilated claims to be unpatentable. The Examiner must follow the basic rule of claim interpretation of reading the claims as a whole. Accordingly, the Blasing reference may not properly be use as a basis for rejecting claims 4, 8, 9 and 14-20 as amended herein under §103.

Finally, the function, way and result provided by the devices and methods disclosed in the Blasing reference are completely different from those provided by the presently claimed invention. The devices disclosed in the Blasing reference require that light signals be measured at two different non-calibration areas of an encoding wheel, that such light signals be compared to one another, and that adjustment of light output occur on the basis of such differential measurement. In contrast, the present invention

requires that a special calibration area be formed on an encoding wheel that has a degree of transparency representative of the encoding wheel as a whole, and that light measured in respect of the calibration area be employed as a basis for adjusting the brightness of light emitted in the direction of indexing and encoding areas of the wheel. Thus, the devices and configurations employed in the Blasing reference, and the results provided by such devices and configurations, have virtually nothing in common with those of the presently-claimed invention other than the fact that light is somehow measured and contaminants disposed on an encoding wheel are somehow compensated for. Such opposing functions, ways and results establish yet further that the presently-claimed invention is not *prima facie* obvious in view of the Blasing reference.

For all the foregoing reasons and more, the presently claimed invention is not *prima facie* obvious in view of the Blasing reference.

(3) Claims 19 and 20 as amended herein are not obvious in view of the Blasing reference over the Benz reference

Claims 19 and 20 as amended herein are not obvious in view of the Blasing reference over the Benz reference for the following reasons.

Claims 19 and 20 as amended herein require all the elements enumerated above in (2). As shown in detail above, the Blasing and Benz references do not disclose, hint at or suggest ***any of the those elements*** recited in claims 19 and 20.

The Applicants have discovered that a certain novel combination of optical, electrical and electronic components combined and configured in a certain order are required to produce the beneficial effects of the present invention. As demonstrated above, most of those components and configurations are neither disclosed nor suggested anywhere in the Blasing or Benz references, and accordingly cannot be *prima facie* obvious.

Merely asserting that "would be obvious to try" the invention by making reference to the generalized position determination techniques disclosed in the Blasing and Benz references, while essentially creating other claimed elements out of whole cloth without referring to any specific portions of the cited references to establish a motivation for combining

elements or functionality disclosed therein, does not establish a *prima facie* case of obviousness. In going from the prior art to the claimed invention, one cannot base obviousness on what a person skilled in the art might try or find obvious to *try*, but rather must consider what the prior art would have lead a person skilled in the art to *do*.

There is no incentive, teaching or suggestion in the Blasing or Benz references to produce the invention now recited in claims 19 and 20. The mere fact that the cited Blasing and Benz references could, with the benefit of hindsight, produce something vaguely similar to the present invention does not make the modification obvious, or suggest the desirability of the modification required to arrive at the present invention. Indeed, this conclusion is buttressed by the fact that numerous elements and limitations are missing in the Blasing and Benz references in respect of claims 19 and 20 as amended herein (and as discussed in detail above).

Moreover, and as discussed in detail above, the Blasing ***and*** Benz reference teaches directly away from the presently-claimed invention by teaching that comparing a single voltage or measurement to a reference voltage or value would result in an optical encoding system incapable of compensating for contaminants disposed on an encoding wheel.

It is well settled that a motivation to combine elements or limitations disclosed in disparate references *must be found within the references themselves or from pertinent sources of extrinsic information,* and that such a motivation does not arise, as here, by merely identifying a collection of disparate piece parts in a combination of references, and then asserting it would have been obvious to take such disparate elements and limitations and add many others thereto to arrive at the presently claimed invention.

There is no suggestion of what direction any experimentation should follow in the Blasing and Benz references to obtain the invention now recited in claims 19 and 20. Accordingly, the result effective variables, for example providing a calibration area on an encoding wheel or disk, transmitting light therethrough, and measuring the light transmitted therethrough and comparing same to a threshold value to arrive at a degree of transparency for the encoding wheel as a whole, and then adjusting the light emitted by a light source in the direction of encoding and indexing portions of the wheel to compensate for the presence of contaminants disposed on the wheel, are not known to be result effective. Thousands or millions of attempts at variations might be made before arriving at the desired improvement. Thus, to say that it would be obvious to read the Blasing and Benz references and somehow arrive at the invention now recited in claims 19 and 20 would clearly not be the test for obviousness.

The foregoing analysis also makes it clear that there is no basis in the art for modifying the teachings of the Blasing and Benz references to arrive at the invention now recited in claims 19 and 20. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. While the Blasing reference teaches some of the problems associated with contaminants being present on an encoding wheel, the solutions to such problems proffered by Blasing and Benz teach directly away from those of the present invention

When, as here, the prior art itself provides no apparent reason for one of ordinary skill in the art to make a modification or to combine references, an argument clearly does not exist that the claimed subject matter would have been obvious. Thus, an attempt to use the applicants' own disclosure as a blueprint to reconstruct in hindsight the invention now recited in claim as amended herein out of isolated teachings appearing in the prior art is clearly be improper.

The results and advantages produced by the invention set forth in claims 19 and 20 as amended herein, and of which the cited Blasing and Benz references are devoid, cannot be ignored simply because the claim limitations might be deemed similar to the otherwise barren prior art.

The foregoing analysis also makes it clear that many limitations appearing in claims 19 and 20 as amended herein are not present in the Blasing and Benz references. When evaluating a claim for determining obviousness, *all* limitations of the claim must be evaluated. Under §103, the Examiner cannot in turn dissect claims 19 and 20 as amended herein, excise the various individual elements recited in the claims, and then declare the remaining portions of the mutilated claims to be unpatentable. The Examiner must follow the basic rule of claim interpretation of reading the claims as a whole. Accordingly, the Blasing and Benz references may not properly be use as a basis for rejecting claims 19 and 20 as amended herein under §103.

Finally, the function, way and result provided by the devices and methods disclosed in the Blasing and Benz reference are completely different from those provided by the presently claimed invention. The devices disclosed in the Blasing and Benz reference require that light signals be measured at two different non-calibration areas of an encoding wheel, that such light signals be compared to one another, and that adjustment of light output occur on the basis of such differential measurement. In contrast, the present invention requires that a special calibration area be formed on an encoding wheel that has a degree of transparency representative of the encoding wheel as a whole, and that light measured in respect of the calibration

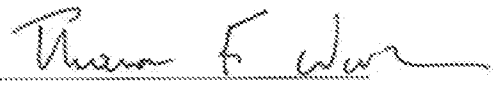
area be employed as a basis for adjusting the brightness of light emitted in the direction of indexing and encoding areas of the wheel. Thus, the devices and configurations employed in the Blasing and Benz references, and the results provided by such devices and configurations, have virtually nothing in common with those of the presently-claimed invention other than the fact that light is somehow measured and contaminants disposed on an encoding wheel are somehow compensated for. Such opposing functions, ways and results establish yet further that the presently-claimed invention is not *prima facie* obvious in view of the Blasing and Benz reference.

For all the foregoing reasons and more, the presently claimed invention is not *prima facie* obvious in view of the Blasing and Benz references.

VII. Summary

Claims 4, 8, 9 and 14-20 remain pending in the present application. In light of the above remarks, Applicants respectfully request allowance of the rejected Claims. The Examiner is invited to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,
Rajaiah et al.
By their attorney



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